



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2021-0273; Project Identifier AD-2021-00050-E]

RIN 2120-AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for all General Electric Company (GE) GEnx-1B64, GEnx-1B64/P1, GEnx-1B64/P2, GEnx-1B67, GEnx-1B67/P1, GEnx-1B67/P2, GEnx-1B70, GEnx-1B70/75/P1, GEnx-1B70/75/P2, GEnx-1B70/P1, GEnx-1B70/P2, GEnx-1B70C/P1, GEnx-1B70C/P2, GEnx-1B74/75/P1, GEnx-1B74/75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, GEnx-2B67, GEnx-2B67/P, and GEnx-2B67B model turbofan engines. This proposed AD was prompted by an in-service occurrence of loss of engine thrust control resulting in uncommanded high thrust. This proposed AD would require revising the operator's existing FAA-approved minimum equipment list (MEL) by incorporating into the MEL the dispatch restrictions listed in this AD. This proposed AD would also require initial and repetitive replacement of the electronic engine control (EEC) MN4 microprocessor. The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: (202) 493-2251.

- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ae.ge.com; website: www.ge.com. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0273; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

FOR FURTHER INFORMATION CONTACT: Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; fax: (781) 238-7199; email: Mehdi.Lamnyi@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2021-0273; Project Identifier AD-2021-00050-E” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to <https://www.regulations.gov>, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Background

The FAA received a report from the manufacturer of an in-service loss of engine thrust control on a GE90-115B model turbofan engine on October 27, 2019, that resulted in uncommanded high thrust. Analysis by the manufacturer found accumulated thermal cycles of the MN4 integrated circuit in the EEC, through normal operation, causes the solder ball joints to wear out and eventually fail over time. Since the GE90 and the GENx model turbofan engines share the same EEC hardware and experience similar thermal and vibratory environments, the manufacturer determined that GENx model turbofan engines are susceptible to the same type of failure. This condition, if not addressed, could result in loss of engine thrust control and reduced control of the airplane.

FAA's Determination

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

Related Service Information under 1 CFR Part 51

The FAA reviewed GE GENx-1B Service Bulletin (SB) 73-0097 R01, dated January 29, 2021, and R00, dated December 17, 2020; and GE GENx-2B SB 73-0090 R01, dated January 28, 2021, and R00, dated December 17, 2020. This service information specifies procedures for replacing the EEC MN4 microprocessor on GENx-1B and GENx-2B model turbofan engines, as applicable. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Proposed AD Requirements in this NPRM

This proposed AD would require revising the existing operator's FAA-approved MEL by incorporating into the MEL the dispatch restrictions listed in paragraph (g) of this AD. This proposed AD would also require initial and repetitive replacement of the EEC MN4 microprocessor using an approved overhaul procedure.

Interim Action

The FAA considers that this proposed AD would be an interim action. If final action is later identified, the FAA might consider additional rulemaking.

Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, would affect 308 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this proposed AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Revise operator's FAA-approved MEL	1 work-hour x \$85 per hour = \$85	\$0	\$85	\$26,180
Replace EEC	1 work-hour x	\$25,200	\$25,285	\$7,787,780

MN4 microprocessor	\$85 per hour = \$85			
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Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA’s authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency’s authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and
- (3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

General Electric Company: Docket No. FAA-2021-0273; Project Identifier AD-2021-00050-E.

(a) Comments Due Date

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to General Electric Company (GE) GEnx-1B64, GEnx-1B64/P1, GEnx-1B64/P2, GEnx-1B67, GEnx-1B67/P1, GEnx-1B67/P2, GEnx-1B70, GEnx-1B70/75/P1, GEnx-1B70/75/P2, GEnx-1B70/P1, GEnx-1B70/P2, GEnx-1B70C/P1, GEnx-1B70C/P2, GEnx-1B74/75/P1, GEnx-1B74/75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, GEnx-2B67, GEnx-2B67/P, and GEnx-2B67B model turbofan engines.

(d) Subject

Joint Aircraft System Component (JASC) Code 7600, Engine Controls.

(e) Unsafe Condition

This AD was prompted by an in-service occurrence of loss of engine thrust control resulting in uncommanded high thrust. The FAA is issuing this AD to prevent dispatch of the airplane when certain conditions caused by degradation of the MN4 microprocessor in the electronic engine control (EEC) are present. The unsafe condition, if not addressed, could result in loss of engine thrust control and reduced control of the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

(1) For all affected GENx-1B model turbofan engines, within 120 days of the effective date of this AD, revise the operator's existing FAA-approved minimum equipment list (MEL) by incorporating into the MEL the dispatch restriction specified in Figure 1 to paragraph (g)(1) of this AD, as a required operation or maintenance procedure.

Note 1 to paragraph (g)(1): Specific alternative MEL wording to accomplish the actions specified in Figure 1 can be approved by the operator's principal operations or maintenance inspector.

Figure 1 to Paragraph (g)(1) – Dispatch Restriction for Engine Indicating and Crew Alerting System (EICAS) MESSAGE ENG EEC C1 for GENx-1B

Dispatch of an airplane is prohibited if the engine indicating and crew alerting system (EICAS) displays the status message “ENG EEC C1 X” (where “X” is engine position: “L” or “R”) and any of the following conditions exist:

- i. None of the maintenance messages in the Central Maintenance Computing Function (CMCF) correlate with “ENG EEC C1 X” status message; or
- ii. The following maintenance message fault codes combination exists in the CMCF for either channel A or B (where “X” is engine position: “1” or “2”).

Fault Combination Description	Corresponding Fault Codes Combination
{TLA out of range fault} AND {FMV/FSV disagree fault OR FMV/FSV out of range fault (on the same channel as TLA out of range fault)}	{76-1953X (CH-A)} AND {73-3204X OR 73-3121X OR 73-1205X OR 73-1122X}
	{76-2953X (CH-B)} AND {73-3204X OR 73-3121X OR 73-2205X OR 73-2122X}

(2) For all affected GENx-2B model turbofan engines, within 120 days of the effective date of this AD, revise the operator's existing FAA-approved MEL by incorporating into the MEL the dispatch restriction specified in Figure 2 to paragraph (g)(2) of this AD, as a required operation or maintenance procedure.

Note 2 to paragraph (g)(2): Specific alternative MEL wording to accomplish the actions specified in Figure 2 can be approved by the operator's principal operations or maintenance inspector.

**Figure 2 to Paragraph (g)(2) – Dispatch Restriction for EICAS MESSAGE
ENG EEC C1 for GENx-2B**

Dispatch of an airplane is prohibited if the engine indicating and crew alerting system (EICAS) displays the status message “ENG X EEC C1” (where “X” is engine position: “1,” “2,” “3,” or “4”) and any of the following conditions exist:

- i. None of the maintenance messages in the Central Maintenance Computer (CMC) correlate with “ENG X EEC C1” status message; or
- ii. The following maintenance message fault codes combination exists in the CMC for either channel A or B (where “X” is engine position: “1,” “2,” “3,” or “4”).

Fault Combination Description	Corresponding Fault Codes Combination
{TLA out of range fault} AND {FMV/FSV disagree fault OR FMV/FSV out of range fault (on the same channel as TLA out of range fault)}	{78X13 (CH-A)} AND {7X132 OR 7X144 OR 7X130 OR 7X145}
	{78X14 (CH-B)} AND {7X132 OR 7X144 OR 7X133 OR 7X146}

(3) For all affected engines, before the EEC reaches 11,000 cycles since new, replace the EEC MN4 microprocessor using an approved overhaul procedure.

(i) Thereafter, replace the EEC MN4 microprocessor before accumulating 11,000 cycles since the last replacement.

(ii) [Reserved]

(h) Definition

For the purposes of this AD, an approved overhaul procedure is one of the following:

(i) Replacement of the EEC MN4 microprocessor using FADEC International-approved maintenance procedures; or

(ii) Replacement of the EEC MN4 microprocessor using the Accomplishment Instructions, paragraph 3., as applicable, of GENx-1B Service Bulletin (SB) 73-0097 R00,

dated December 17, 2020, or R01, dated January 29, 2021; or GENx-2B SB 73-0090 R00, dated December 17, 2020, or R01, dated January 28, 2021.

(i) Installation Prohibition

After the effective date of this AD, do not install onto any engine an EEC with a main channel board that was subject to more than three replacements of the EEC MN4 microprocessor.

(j) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in Related Information. Information may be emailed to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(k) Related Information

(1) For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; fax: (781) 238-7199; email: Mehdi.Lamnyi@faa.gov.

(2) For service information identified in this AD, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ae.ge.com; website: www.ge.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

Issued on April 7, 2021.

Lance T. Gant, Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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